3-6665-260-50

TB 3-6665-260-50

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR CHEMICAL AGENT AUTOMATIC ALARM TEST SET M74

Headquarters, Department of the Army, Washington, D. C.
30 March 1973

		Paragraph	Page
SECTION I.	IDENTIFICATION AND DESCRIPTION		
	Test instrument identification	1	1
	Calibration data card (DA Form 2416)	2	1
	Reporting of errors	3	1
	Calibration description	4	2
II.	EQUIPMENT REQUIREMENTS		
	Equipment required	5	2
	Accessories required	6	2
III.	PRELIMINARY OPERATIONS		
	Preliminary instructions	7	3
	Equipment setup	8	4
IV.	CALIBRATION PROCESS		
	Meter circuits	9	4
	Trigger circuits	10	6
	Inlet temperature test	11	7
	Pressure test	12	7
	Vacuum test	13	8
	Flowmeter test	14	9
	Final procedure	15	10

SECTION I

IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. *a. General.* This bulletin provides instructions for the calibration of Chemcial Agent Automatic Alarm Test Set M74 which is used to test the operational status of Portable Chemical Agent Automatic Alarm, M8. Reference TM 3–6665–260–14 for operator's, organizational, direct support, and general support maintenance instructions. The chemical agent automatic alarm test set will be referred to as the "test instrument" throughout this bulletin.

b. Time and Technique. The time required for this calibration is approximately three hours, using the dc and low frequency and physical techniques.

2. Calibration Data Card (DA Form 2416). Maintenance forms, records, and reports which are to be used by calibration personnel at all calibration levels are listed in and prescribed by TM 38–750.

3. Reporting of Errors. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publica-

This copy is a reprint which includes current pages from Change 2.

D 101.25:

READEX FICHE best copy available

tions) and forwarded direct to Commander, Edgewood Arsenal, ATTN: SMUEA–DE–ET, Edgewood Arsenal, MD 21010.

4. Calibration Description. Test instrument parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	*Performance specifications*
17-volt meter circuit calibration	16.9 to 17.1 vdc input causes indication within green zone on meter M1.
24-volt meter circuit calibration: (MOTOR position) (SUPPLY position) (METER CIRCUIT position)	Requires 24 to 25 vdc input for 24-volt indication.
40-volt meter circuit calibration: (AMP position)	Requires 38.4 to 41.6 vdc input for 20-volt indication.
40-volt meter circuit calibration: (METER CIRCUIT position) (SUPPLY position) (MOTOR position)	Requires 38.4 to 41.6 vdc input for 40-volt indication.
Trigger circuit calibration	14 to 16 millivolts available with 5 volts dc applied; meter indicates within red zone.
Inlet air temperature sensing circuit	Meter indicates within red zone when inlet temperature is +90° F. to +95° F.
Pressure indicator accuracy and system leakage.	Indication agree within ±0.5 inch of water when compared with transfer standard manometer pressurized to 24 inches of water and does not change more than 0.5 inch of water over a 2-minute period.
Vacuum system leakage	With a 24 inches-of-water vacuum, leakage rate is less than 0.5-inch of water over a 2-minute period.
Flowmeter calibration	Within 0.1 liter/minute at 0.9 liter/minute and at 1.4 liter/minute.

SECTION II

EQUIPMENT REQUIREMENTS

5. Equipment Required. Table 2 identifies the specific equipment used in this calibration procedure. This equipment is issued with secondary transfer calibration standards set 4931–621–7877 and is to be used in performing this procedure. Alternate items may be used by the calibrating activity when the equipment listed in table 2 is not available; however, alternate items selected must be verified to perform satisfactorily prior to use. All applicable equipment must bear evidence of current calibration.

6. Accessories Required. The accessories listed in table 3 are issued with secondary transfer calibration standards set 4931–621–7877 and are to be used in this calibration procedure. When necessary, these items may be substituted by equivalent items unless specifically prohibited.

Table 2. Minimum Specifications of Equipment Required

Item	Common name	Minimum use specifications	Manufacturer, model, and part No.
A1	FLOWMETER	Range: 49 mm/min. to 94 mm/min. Accuracy: ±2.0%	Schutte and Koerting 18200 series (7907273) Tube—03RY3 Float—R–033
A2	MANOMETER	Range: 0 to 25 in. of water Accuracy: ±0.16 in. of water	Wallace and Tiernan FA145000
A3	POWER SUPPLY	Range: 0 to 50 vdc	John Fluke Model 407
A4	THERMOMETER	Range: +31° F. to +124° F.	FSN 6685–830–9656
A5	VOLTMETER	Range: 0 to 50 vdc Accuracy: ±1.0%	Dyna Model 5703
A6	VOLTMETER	Range: 0 to 30 mvdc Accuracy: ±1.0%	John Fluke Model 887AB (MIS–10216)

Table 3. Required Accessories

Item	*Common name*	*Description and part No.*
B1	FLEXIBLE TUBING	0.25-inch ID, 12 inches long
B2	FLOW VALVE	Ruska, Part No. 2001
B3	VACUUM PUMP	(7912361) FSN 4931-929-8403
B4	TEST LEADS[1]	50 inches, FSN 6665-395-0223

[1] Six required.

SECTION III

PRELIMINARY OPERATIONS

7. Preliminary Instructions. *a.* The instructions in this paragraph are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name and item identification number as listed in tables 2 and 3. For identification of equipment referenced by item numbers prefixed with A, see table 2, and for prefix B, see table 3.

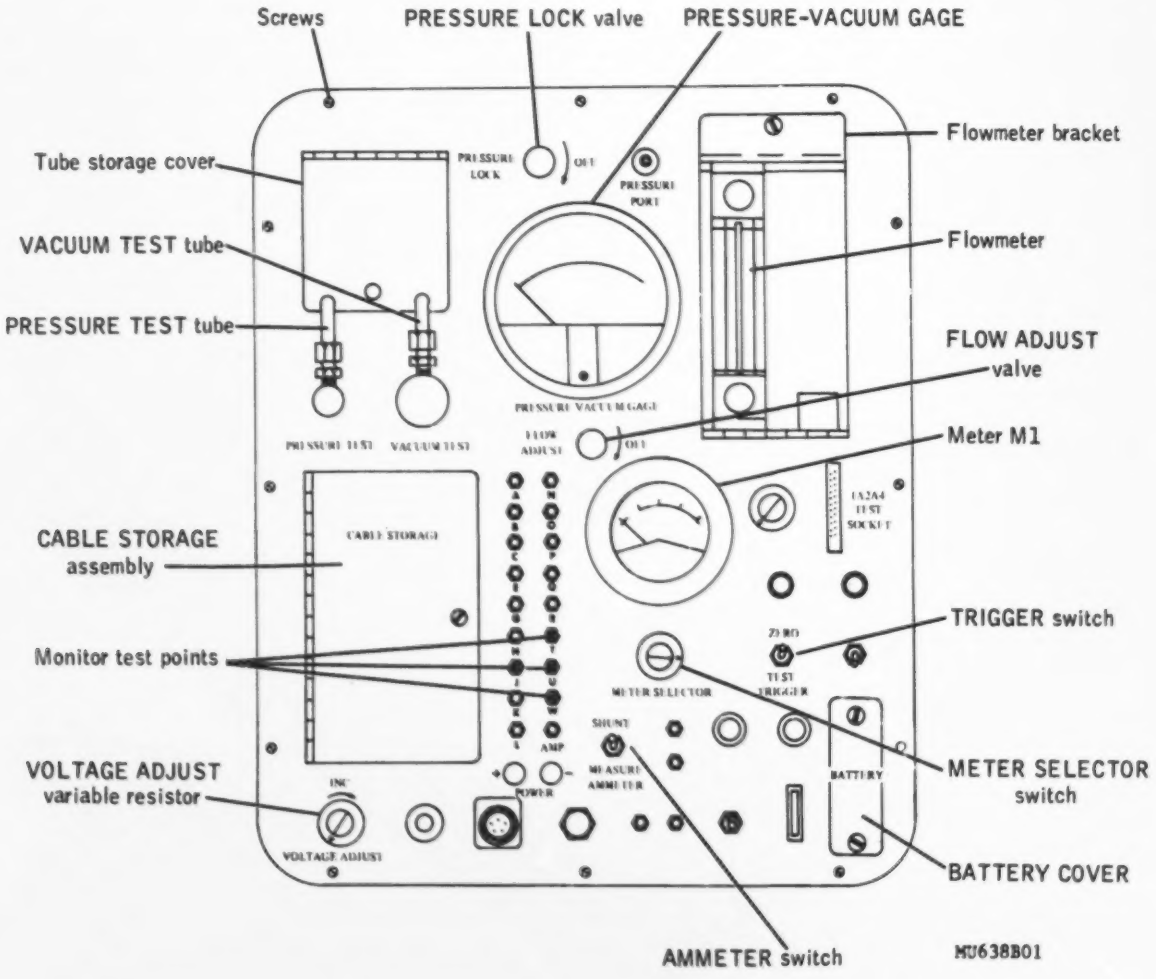

Figure 1. Test set controls and indicators used during calibration.

WARNING

HIGH VOLTAGE is used during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

8. Equipment Setup. *a.* Place test instrument on a flat surface, and unlatch and remove cover.

b. Adjust mechanical zero-adjustment on test instrument meter M1 (fig. 1) to zero.

c. Adjust mechanical zero-adjustment screw on PRESSURE-VACUUM GAGE to zero.

SECTION IV

CALIBRATION PROCESS

NOTE

Whenever a test requirement is not met, take corrective action and verify compliance with test requirement before proceeding.

9. Meter Circuits. *a. Performance Check.*

(1) *Test setup.*

(*a*) Set test instrument **AMMETER** switch (fig. 1) to SHUNT.

(*b*) Rotate VOLTAGE ADJUST variable resistor fully clockwise.

(*c*) Loosen knurled screw on door of CABLE STORAGE assembly and remove CHASSIS TEST cable (fig. 2).

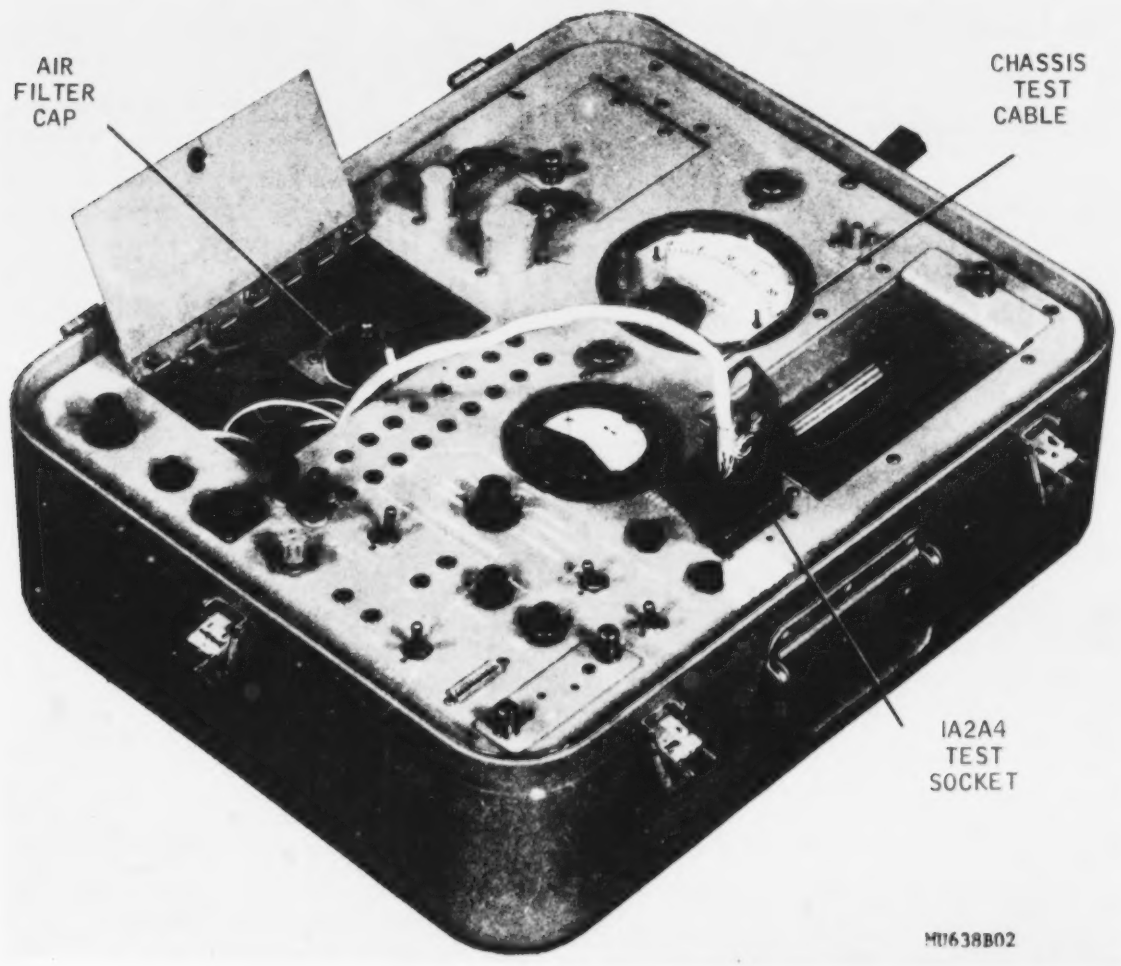

Figure 2. Chassis test cable connection.

(*d*) While observing pin orientation, plug CHASSIS TEST cable connector into 1A2A4 TEST SOCKET.

(*e*) Connect test equipment as shown in figure 3.

(2) *17-volt meter circuits.*

(*a*) Position test instrument METER SELECTOR (fig. 1) to 17V TEST.

(*b*) Set power supply A3 for minimum voltage output, energize, and allow to warmup.

(*c*) Adjust power supply A3 for voltmeter A5 indication between 16.9 and 17.1 vdc. The test instrument meter M1 (fig. 1) pointer will indicate within green band on dial face.

(3) *24-volt meter circuit.*

(*a*) Position test instrument METER SELECTOR switch to MOTOR VOLTAGE.

(*b*) Disconnect red test lead B4 from monitor test point U and connect to monitor test point T.

(*c*) Adjust power supply for indication on meter M1 of 24. Voltmeter A5 will indicate between 24 and 25 volts.

(*d*) Position METER SELECTOR switch to SUPPLY.

(*e*) Repeat (*c*) above.

(*f*) Position METER SELECTOR switch to METER CKT.

(*g*) Repeat (*c*) above.

(4) *40-volt meter circuits.*

(*a*) Position METER SELECTOR switch to AMP TEST.

(*b*) Adjust power supply for indication on meter M1 of 20. Voltmeter A5 will indicate between 38.4 and 41.6 volts.

(*c*) Position METER SELECTOR switch to METER CIRCUIT.

(*d*) Adjust power supply for indication on meter M1 of 40. Voltmeter A5 will indicate between 38.4 and 41.6 volts.

(*e*) Position METER SELECTOR switch to SUPPLY.

(*f*) Repeat (*d*) above.

(*g*) Position METER SELECTOR switch to MOTOR VOLTAGE.

(*h*) Repeat (*d*) above.

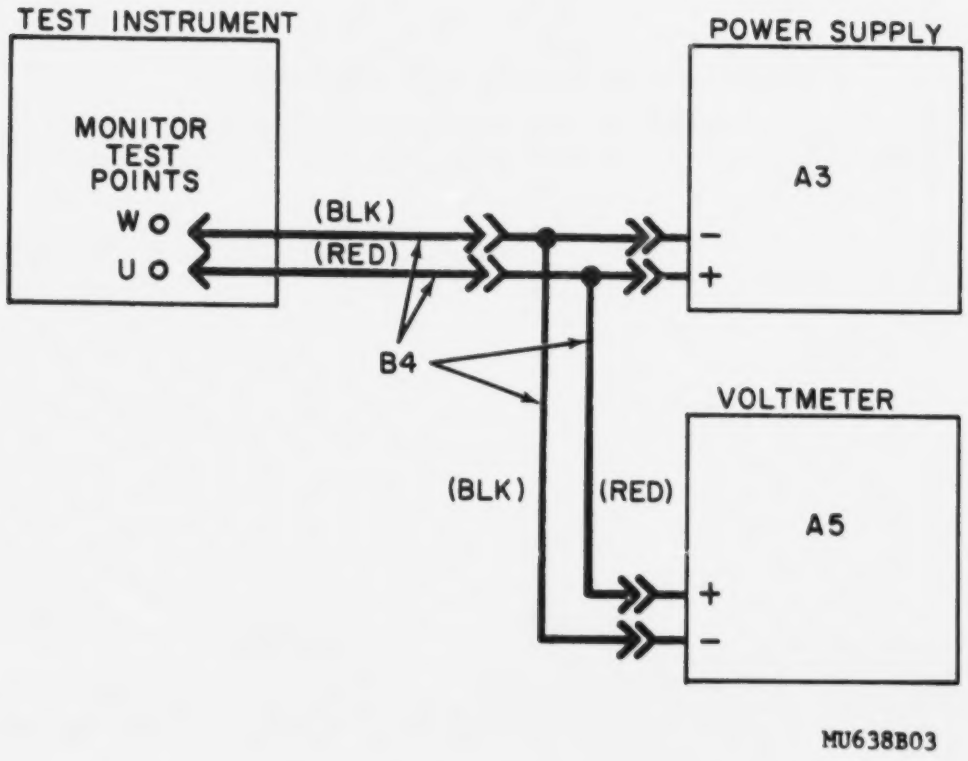

Figure 3. Meter circuits test—equipment setup.

b. Adjustments. No adjustments can be made.

10. Trigger Circuits. *a. Performance Check.*

(1) *Test setup.*

(*a*) Loosen knurled screws securing BATTERY cover (fig. 1), lift cover, and remove battery.

(*b*) Connect equipment as shown in figure 4.

NOTE

Be sure that the test leads are connected to the battery clips.

(2) *Test procedure.*

(*a*) Position METER SELECTOR switch (fig. 1) to TRIGGER TEST.

(*b*) Set TRIGGER switch to TEST.

(*c*) Adjust power supply for minimum voltage output.

(*d*) Adjust voltmeter A6 to measure 16 millivolts.

(*e*) Gradually increase ouptut of power supply A3 until pointer of meter A1 is centered in red band on dial face. Allow 5 seconds minimum for the indication to stabilize; adjust power supply A3 if necessary. Voltmeter A6 will indicate between 14 and 16 millivolts and voltmeter A5 will indicate less than 5 volts.

(*f*) Set TRIGGER switch to ZERO.

(*g*) Turn off power supply A3 and disconnect equipment.

CAUTION

Observe polarity when installing battery in clips. Improper installation will damage the equipment.

(*h*) Reinstall battery and secure BATTERY cover in position.

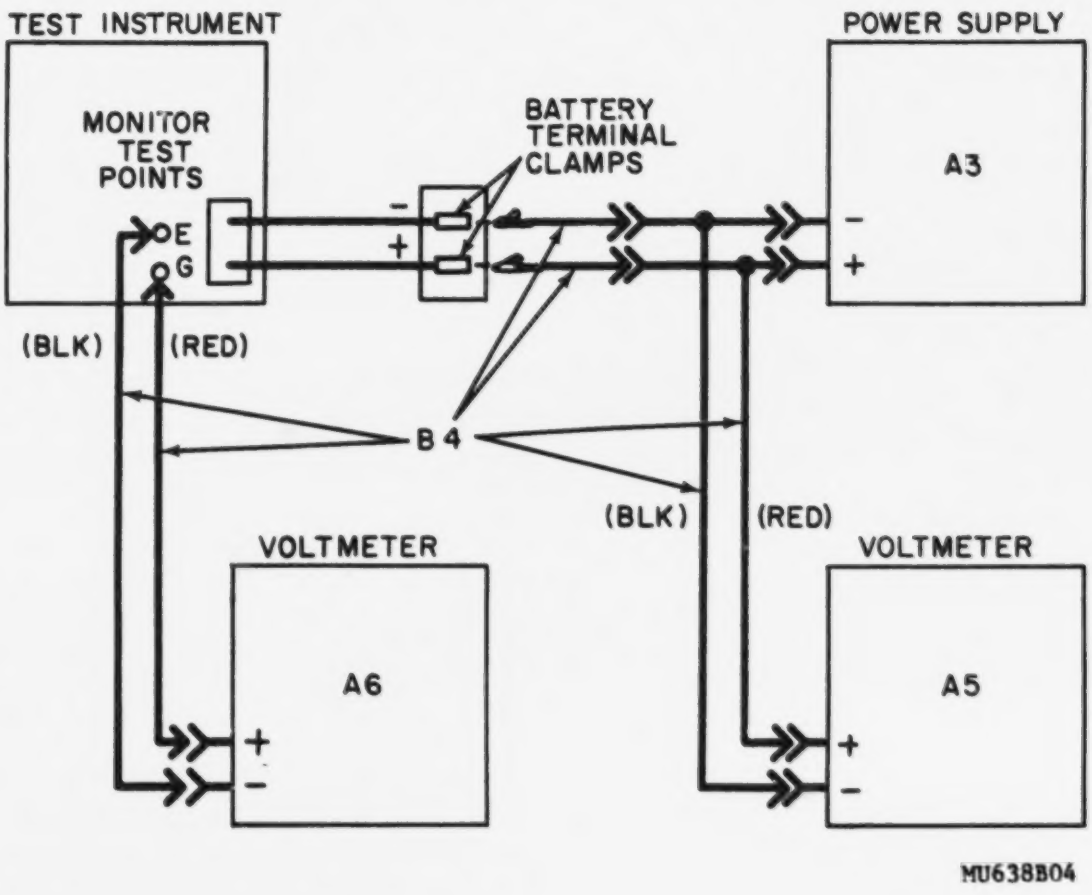

Figure 4. Trigger circuits test—equipment setup.

b. Adjustments. No adjustments can be made.

11. Inlet Temperature Test. *a. Performance Check.*

(1) *Test setup.*

(*a*) Open door of test instrument CABLE STORAGE assembly and unscrew air filter cap (fig. 2).

(*b*) Provide a clean container with water at +92.5° F. ±2.5° F. Use thermometer A4 to monitor water temperature during test (fig. 5).

(*c*) Connect equipment as shown in figure 6.

(2) *Test procedure.*

(*a*) Position test instrument METER SELECTOR switch to INLET TEMP.

(*b*) Set AMMETER switch to SHUNT.

(*c*) Adjust power supply A3 for minimum voltage output, energize, and allow to warm up.

(*d*) Gradually increase output of power supply for voltmeter A5 indication of 24 vdc. The pointer of meter M1 will be stable within the red band on the dial face. If not, perform *b* below.

(*e*) Turn off power supply and disconnect equipment.

b. Adjustments.

(1) Replace paddle assembly in its housing assembly (fig. 5).

(2) Remove 12 screws that secure test instrument panel assembly in its case and remove panel assembly.

(3) Position panel so that meter M1 is horizontal and facing upward.

(4) Repeat (*a*) through (*d*) above.

(5) Adjust R24 (fig. 7) to center pointer of meter M1 in red band on dial face.

(6) Remove paddle assembly from water, shake off excess water, and replace and secure it in its housing assembly (fig. 5).

(7) Turn off power supply A3 and disconnect equipment.

(8) Reassemble panel assembly to case and secure with screws removed in (2) above.

12. Pressure Test. *a. Performance Check.*

(1) *Test setup.*

(*a*) Open test instrument tube storage cover (fig. 1) and remove open end of PRESSURE TEST tube.

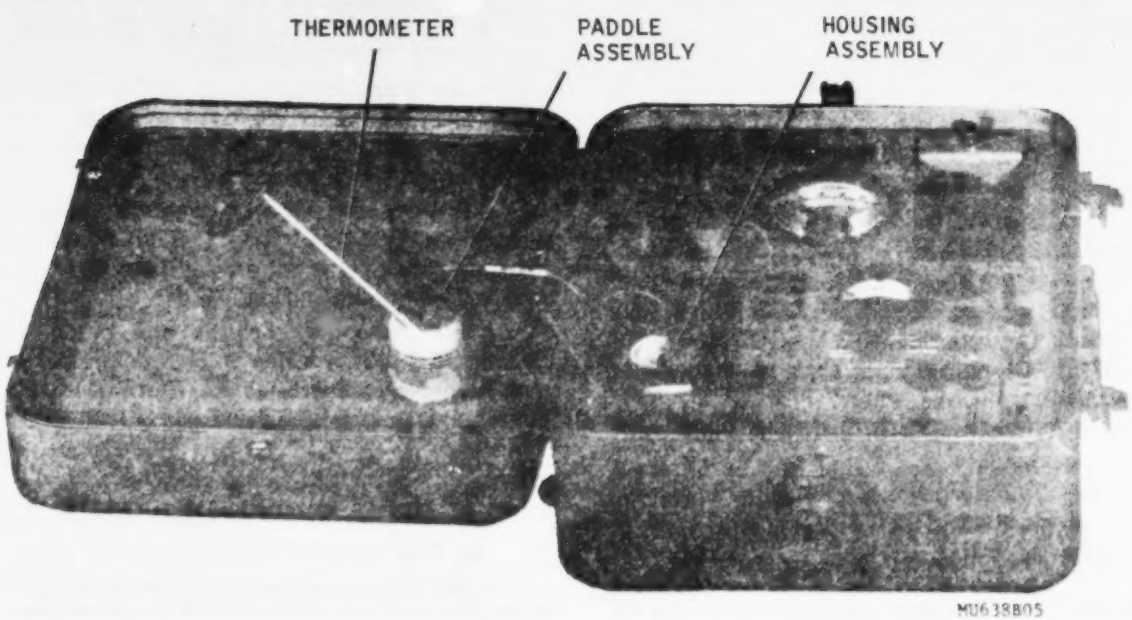

Figure 5. Paddle assembly prepared for performance check.

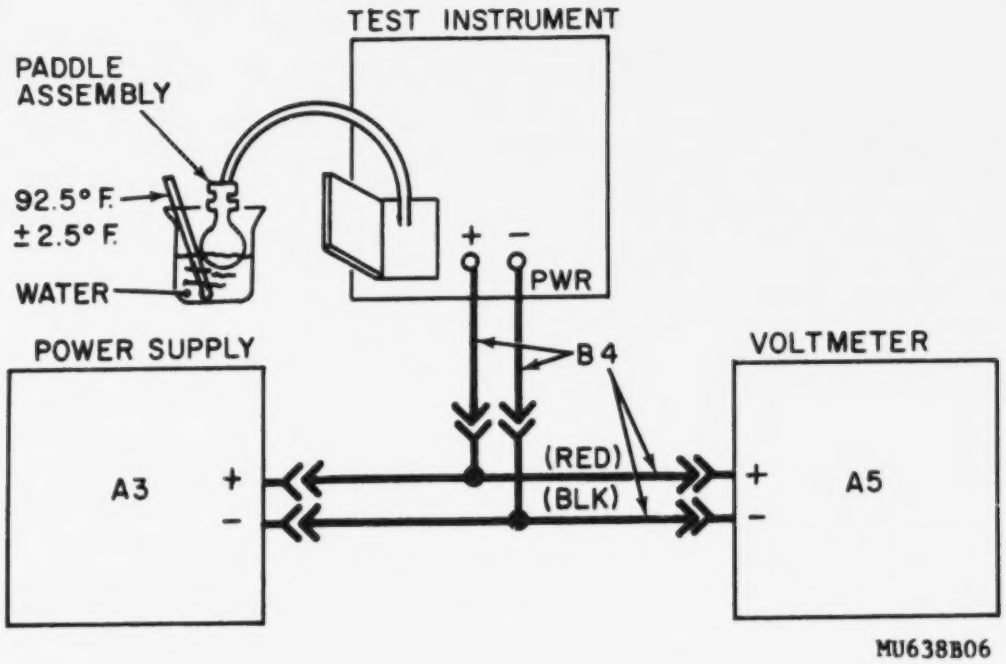

Figure 6. Inlet temperature test—equipment setup.

(*b*) Remove bellows and pump from test instrument cover compartment.

(*c*) Connect equipment as shown in figure 8.

(2) *Test procedure.*

(*a*) Turn PRESSURE LOCK valve (fig. 1) fully counter-clockwise.

(*b*) Operate bellows and pump to get an indication on PRESSURE-VACUUM GAGE of 6.0 inches of water.

(*c*) Turn PRESSURE LOCK valve fully clockwise. The PRESSURE-VACUUM GAGE indication will agree with that of manometer **A2** within 0.5 inch of water.

(*d*) Turn PRESSURE LOCK valve fully counterclockwise.

(*e*) Operate bellows and pump to get an indication on PRESSURE-VACUUM GAGE of 10.0 inches of water.

(*f*) Turn PRESSURE LOCK valve fully clockwise. The PRESSURE-VACUUM GAGE indication will agree with that of manometer **A2** within 0.5 inch of water.

(*g*) Turn PRESSURE LOCK valve fully counterclockwise.

(*h*) Operate bellows and pump to get an indication on PRESSURE-VACUUM GAGE of 23.0 to 25.0 inches of water.

(*i*) Turn PRESSURE LOCK valve fully clockwise. The PRESSURE-VACUUM GAGE indication will agree with that of manometer **A2** within 1.0 inch of water.

(*j*) Observe rate of pressure change indicated on PRESSURE-VACUUM GAGE. The pressure change will not exceed 0.5 inch of water over a two-minute period.

(*k*) Disconnect bellows and pump, turn PRESSURE LOCK valve fully counterclockwise, and disconnect manometer **A2**. Store bellows and pump in test instrument lid.

b. Adjustments. No adjustments can be made.

13. Vacuum Test. *a. Performance Check.*

(1) *Test Setup.*

(*a*) Loosen screw securing test instrument flowmeter bracket (fig. 9) and pivot bracket to vertical position. Secure by pivoting plate retainer.

(*b*) Connect equipment as shown in figure 10.

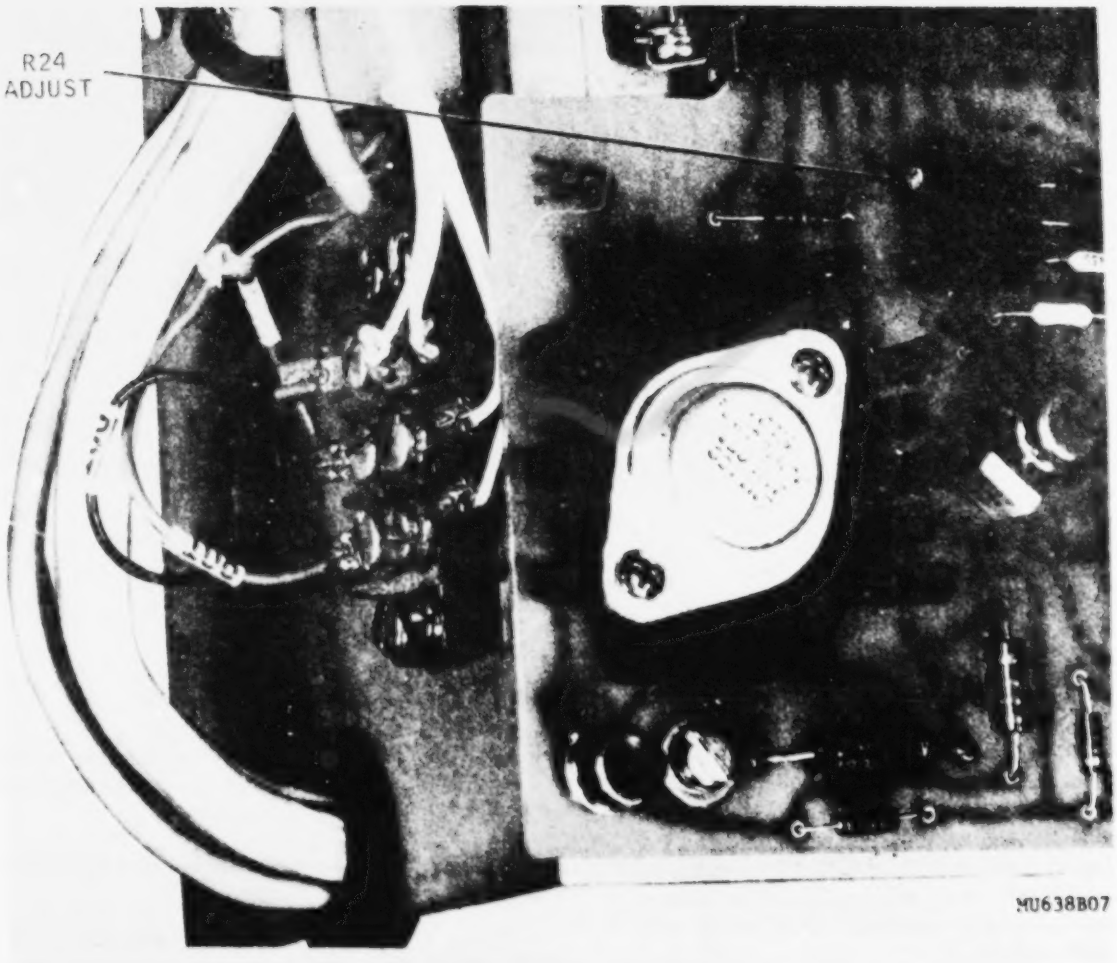

Figure 7. Location, R24.

NOTE

The adapter and stopper, fitting assembly are located in test instrument lid.

(c) Turn FLOW ADJUST valve fully counterclockwise.

(d) Turn PRESSURE LOCK valve fully counterclockwise.

(e) Close flow valve B2.

(2) *Test procedure.*

(a) Turn on VACUUM pump B3.

(b) Gradually open flow valve B2 until test instrument PRESSURE-VACUUM GAGE indicates 24 ±1.0 inches of water. Close flow valve B2.

(c) Turn off vacuum pump B3.

(d) Observe rate of pressure indication change on PRESSURE-VACUUM GAGE. The pressure change will not exceed 0.5 inch of water over a two minute period.

(e) Remove stopper, fitting assembly from the adapter.

(f) Open flow valve B2.

b. Adjustments. **No adjustments can be made.**

14. Flowmeter Test. ***a. Performance Check.***

(1) *Test setup.*

(a) Connect equipment as shown in figure 11.

(b) Turn FLOW ADJUST valve fully counterclockwise.

(c) Close flow valve B2.

(2) *Test procedure.*

(a) Turn on vacuum pump.

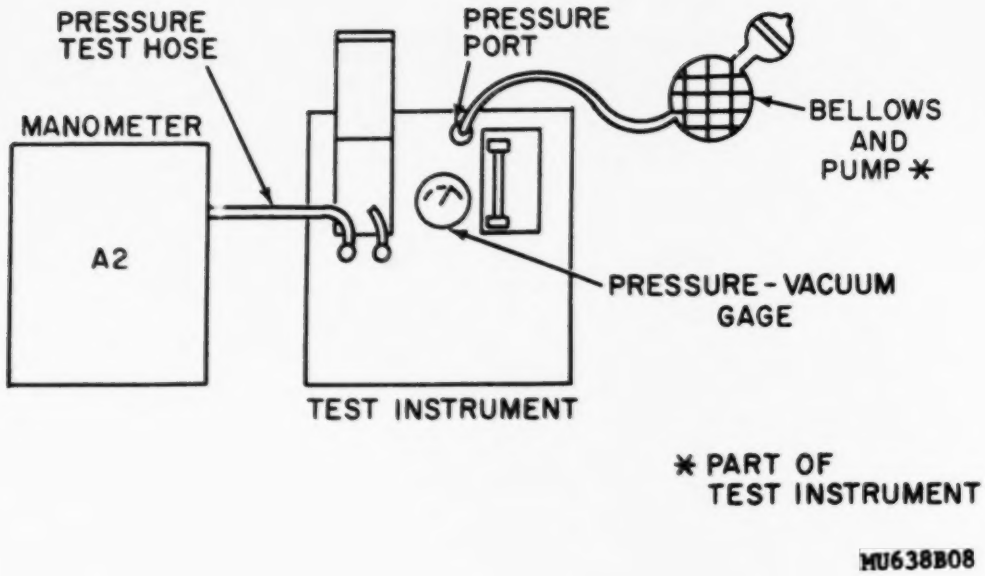

Figure 8. Pressure test—equipment setup.

(*b*) Adjust flow valve B2 to obtain test instrument flowmeter indication of 1.1 liters per minute. The PRESSURE-VACUUM GAGE indication will not exceed 5.0 inches of water.

(*c*) Adjust flow valve B2 for test instrument flowmeter indication of 0.5 liter per minute. Flowmeter A1 will indicate 49.5 ±0.5 millimeters per minute.

(*d*) Adjust flow valve B2 for test instrument flowmeter indication of 1.0 liter per minute. Flowmeter A1 will indicate 85.5 ±0.5 millimeters per minute.

(*e*) Adjust flow valve B2 for test instrument flowmeter indication of 1.4 liters per minute. Flowmeter A1 with indicate 93.5 ±0.5 millimeters per minute.

15. Final Procedure. *a*. Deenergize vacuum pump B3.

b. Disconnect test instrument vacuum hose from flow valve B2 and flexible tubing B1 from flowmeter A1.

c. Remove the adapter, plug, and flexible tubing from test instrument. Store the adapter and plug in the test instrument cover.

d. Rotate plate retainer (fig. 9), fold flowmeter bracket, and secure.

e. Store PRESSURE TEST hose and VACUUM TEST hose and secure tube storage door (fig. 1).

f. Store CHASSIS TEST cable (fig. 2) in CABLE STORAGE assembly and secure door.

g. Deenergize and disconnect all test equipment, reinstall protective cover on test instrument, and secure with latches.

h. In accordance with TM 38–750, annotate and affix DA Label 80 (U.S. Army Calibration System). When test instrument cannot be adjusted within tolerance, annotate and affix DA Form 2417 (Unserviceable or Limited Use) (red tag).

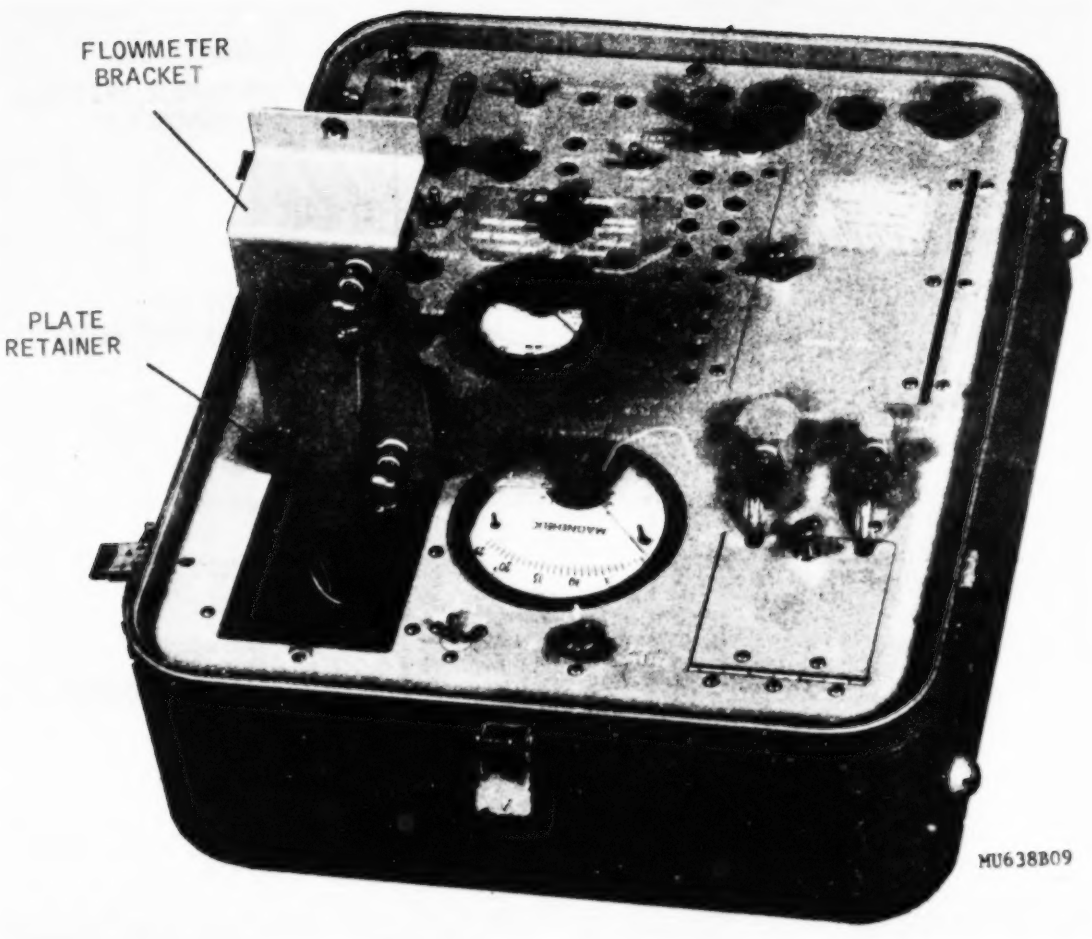

Figure 9. Flowmeter bracket secured in vertical position.

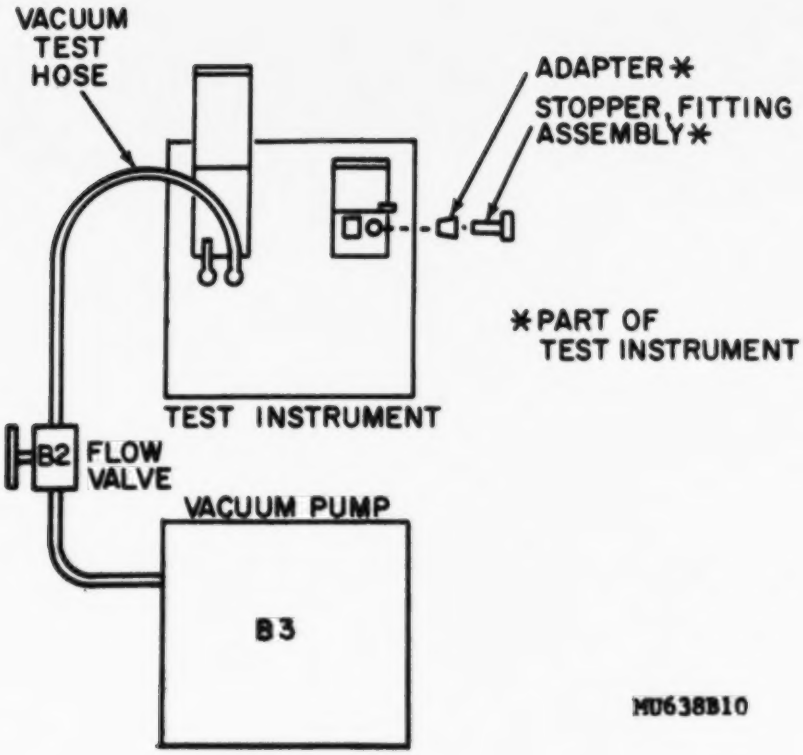

Figure 10. Vacuum test—equipment setup.

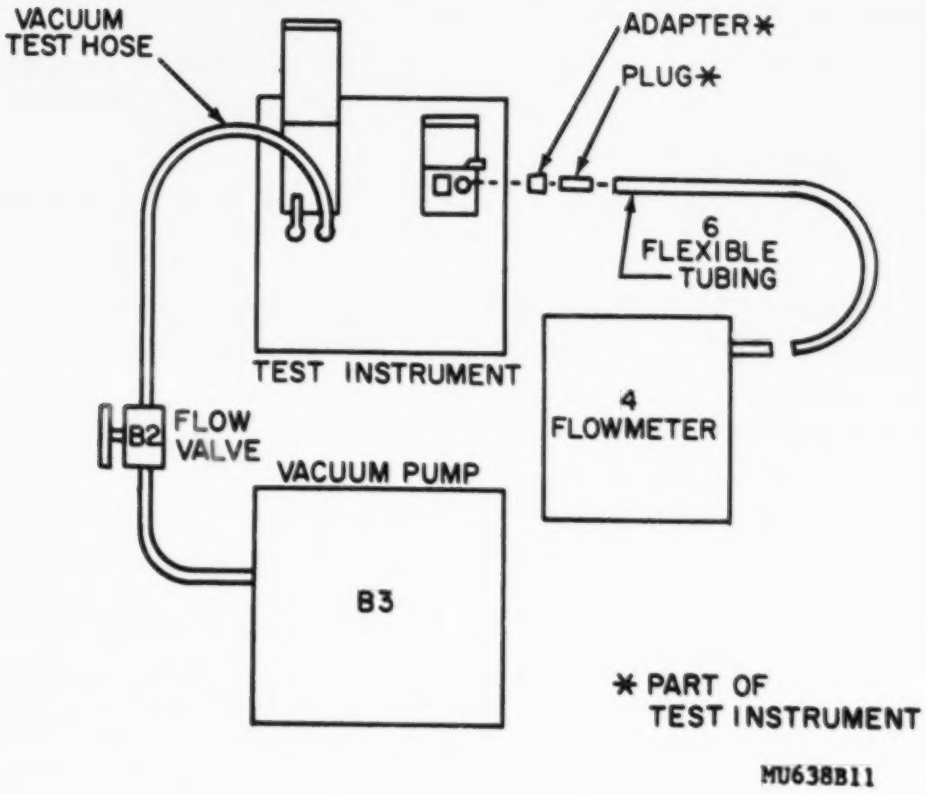

Figure 11. Flowmeter test—equipment setup.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12–34 (qty rqr block No. 75) requirements for Calibration Procedure Publications.

TB 3-6665-260-50

*Change 2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR CHEMICAL AGENT AUTOMATIC ALARM TEST SET M74

Headquarters, Department of the Army, Washington, DC
13 December 1974

TM 3-6665-260-50, 30 March 1973 is changed as follows:

Page 1, paragraph 1. In the third line, "Chemcial" is changed to read "Chemical." In the sixth line, "Alarm, M8." is changed to read "Alarm: M8, M10 through M18."

Page 1, paragraph 3. In the last two lines the attention line is changed to read "ATTN: SAREA-DE-ET, Aberdeen Proving Ground, MD 21010."

Page 2, table 1. In the second performance specification "24 to 25 vdc" is changed to read "23 to 25 vdc." In the sixth performance specification, "+90°F. to +95°F." is changed to read "92°F. to 93°F." The last performance specification is changed to read "Within 0.1 liter/minute at 0.5 liter/minute, at 1.0 liter/minute, and at 1.4 liter/minute."

Page 2, table 2. In the minimum use specifications column for item A1, "94 mm/min." is changed to read "114 mm/min." In the manufacturer, model, and part no. column for item A1, "Tube — 03RY3" is changed to read "Tube — 03RYb."

Page 5, paragraph 9*a*(3)(*c*). In line 3, "24 and 25 volts" is changed to read "23 and 25 volts."

Page 7, paragraph 11. In subparagraph *a*(1)(*b*), line 2, "+92.5°F. ±2.5°F." is changed to read "+92.5°F. ±0.5°F." In subparagraph *a*(2)(*d*), add, "Otherwise proceed to (*e*) below." In subparagraph *b*(1), add "Remove water container and thermometer from surface of inner lid assembly to prevent spillage." Change subparagraph *b*(4) to read "Repeat 1(*a*) through (*c*) and (2)(*a*) through (*d*), above."

Page 8, figure 6. Change "92.5°F. ±2.5°F." to read "92.5°F. ±0.5°F."

Page 10, paragraph 14*a*(2). In subparagraph (*c*), change "49.5 ±0.5" to read "49.5±8.0." In subparagraph (*d*), change "85.5 ±0.5" to read "85.5 ±8.0." In subparagraph (*e*), change "93.5±0.5" to read "114.0±8.0."

Page 13, figure 11. Change "4 FLOWMETER" to read "A1 FLOWMETER."

*This change supersedes C 1, 31 July 1974.

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-34, (qty rqr block no. 75) Requirements for Calibration Procedures Publications.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1989 O - 242-451 (5161)

PIN : 009849-000